

Green River Formation Water Flood Demonstration Project -- Class I

Inland Resources, Inc.

Green river Formation

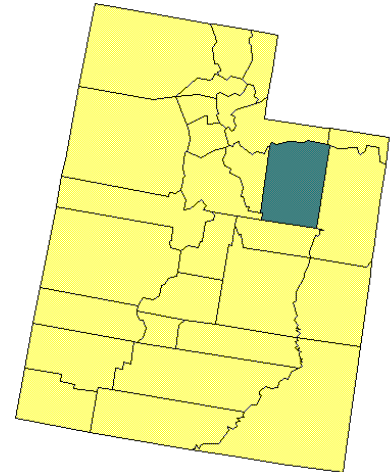
Monument Butte Unit

@ 5,600 ft.

Duchesne County, UT

Eocene Age

Uinta Basin



DE-FC22-93BC14958

Contract Period:

10/21/1992 to 3/31/1996

DOE Project Manager:

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Objective: This project is designed to (1) evaluate the success of the Monument Butte Unit waterflood and determine the recovery mechanisms, (2) extend the waterflooding technology to the nearby Travis and Boundary Unit project areas, (3) develop new techniques to characterize reservoir heterogeneity and evaluate the response of the reservoir to the waterflood, and (4) transfer the technology to operators, regulators, other government agencies, and the final community.

Technologies Used: Core/Fluid analysis, numerical simulation, logging tool, paraffin control, characterization, drilling tests, waterflood, reservoir modeling.

Background: Waterflooding technology was not commonly used in the Uinta Basin due to the low permeability, heterogeneity and paraffinic oil of the reservoirs. Contrary to convention, Lomax successfully implemented a waterflood on their Monument Butte property. Primary methods produced about 5% of the original oil in place (OOIP). Production from waterflooding indicated an estimated recovery of 20% OOIP. This project was developed to identify the recovery mechanisms operating in the successful waterflood of the fluival deltaic reservoir, and to test the applicability of the process to other nearby, similar fields. The project is a waterflood demonstration project in the Green River Formation of the Uinta Basin. This project was started by Lomax Exploration, which was sold to Inlands Resources during the course of the project.

Incremental Production: As of December 1994, a total of 241,768 bbl of incremental oil have been produced from the Monument Butte and Travis Units since project start in October 1992.

Expected Benefits and Applications: Both the waterflooding process demonstrated and the techniques used are expected to apply to other fields in the area, as well as to other high-paraffin, heterogeneous reservoirs. The widespread application of the waterflooding technology to other high-paraffin oil reservoirs could add reserves as much as tens of millions of barrels of oil. Thirteen waterflood projects have been initiated by other companies in the area. More than 300 wells will ultimately be waterflooded based on the technologies demonstrated by the project.

Accomplishments: Case studies for Monument Butte, Travis, and Boundary Units have been completed. Five wells in Monument Butte, two wells in Travis Unit, and two wells in the Boundary Units have been drilled and completed. Full-diameter core, FMI logs, side wall cores, porosities, permeabilities, detailed isopach maps, relative permeabilities, PVT properties, and bulk fluid properties have been completed. Comprehensive history match from numerical simulations, performance predictions, unit expansions, infill analysis, visualization, wax precipitation, heat transfer, bulk properties, compositions, PVT properties, and corefloods have been completed. Case study of reservoir models, expanded reservoir models, infill models, and wax models have been completed. Geostatistical analysis of reservoir properties and sand connectivities has been completed. Demonstration of the use of waterflooding technology in high-paraffin oil reservoirs has been very successful and the has been adopted by other companies in the Rocky Mountains.

Publications: (1) Pawar, et al., "Effect of Scale and Connectivity on Primary and Secondary Recovery". SPE/DOE 10th Symposium on Improved Oil Recovery, April 21-24, Tulsa, OK. (2) Deo, M., Miharia, A., and Kumar, R., 1995, "Solid Precipitation in Reservoirs Due to Non-isothermal Injections", SPE Paper 28967, presented at the SPE International Oilfield Chemistry Symposium, San Antonio, TX, February 1995. (3) Deo, M. D., Neer, L. A., Whitney, E. M., Nielson, D. L., Lomax, J. D. and Pennington, B. I., 1995, "Description and Performance of a Lacustrine Fractured Reservoir", SPE 28938, presented in the Poster Session of the Annual Fall Meeting of the Society of Petroleum Engineers. (4) B. Marin, "Advanced fracture modeling in the Uinta Basin (Utah) for optimizing primary and secondary recovery", 4th Naturally Fractured Reservoir Symposium, October 27, 1998, Socorro, New Mexico. (5) Gill, Douglas, 1998. "Uinta Basin", Oil and Gas Investor, Vol. 18, No. 3, March 1998, pp. 26-37.

Recent/Upcoming Technology Transfer Events: An invited paper was presented on the results of the comprehensive geologic characterization and reservoir simulations at the American Association of Petroleum Geologists Rocky Mountain regional meeting in July 1996, Billings, Montana.

Project Status: Project initiated by Lomax Exploration company which sold to Inland Resources Inc. during the course of the project. Project completed. Final report published November 1996.